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# Taxonomic Novelties in *Rauwolfia* (Apocynaceae, Rauvolfioideae) from Brazil

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**ABSTRACT.** Descriptions and illustrations of three new Brazilian species of the genus *Rauwolfia* L. (Apocynaceae, Rauvolfioideae), *R. capixabae* I. Koch & Kinoshita-Gouvêa, *R. gracilis* I. Koch & Kinoshita-Gouvêa, and *R. pruinifolia* I. Koch & Kinoshita-Gouvêa, are presented. *Rauwolfia blanchetii* A. DC., *R. mollis* S. Moore, and *R. divergens* Markgraf are newly synonymized under *R. ligustrina* Willdenow, *R. pernambucensis* Emygdio under *R. moricandii* A. DC., and *R. sessilifolia* S. Moore under *R. weddelliana* Müller Argoviensis. Lectotypes for *R. blanchetii* and *R. ternifolia* Kunth are designated; furthermore, comments to clarify the complicated typification of *R. ligustrina* and *R. ternifolia* are presented.

**RESUMO.** São apresentadas descrições e ilustrações de três novas espécies brasileiras do gênero *Rauwolfia* L. (Apocynaceae, Rauvolfioideae), *R. capixabae* I. Koch & Kinoshita-Gouvêa, *R. gracilis* I. Koch & Kinoshita-Gouvêa e *R. pruinifolia* I. Koch & Kinoshita-Gouvêa. *Rauwolfia blanchetii* A. DC., *R. mollis* S. Moore e *R. divergens* Markgraf são sinonimizadas à *R. ligustrina* Willdenow, *R. pernambucensis* Emygdio à *R. moricandii* A. DC., e *R. sessilifolia* S. Moore à *R. weddelliana* Müller Argoviensis. São designados lectótipos para *R. blanchetii* e *R. ternifolia* Kunth e são apresentados comentários para o esclarecimento da complexa tipificação de *R. ligustrina* e *R. ternifolia*.

**Key words:** Apocynaceae, Brazil, *Rauwolfia*, Rauvolfioideae.

The genus *Rauwolfia* L. belongs to the family Apocynaceae, subfamily Rauvolfioideae. Its species are distributed throughout the tropical regions of the

world. Currently, 60 species are estimated to belong in the genus (Mabberley, 1997). They characteristically have whorled leaves and branches, hypocrateriform flowers, and generally small, drupaceous, variously syncarpous or apocarpous fruits with two pyrenes. Although flowers are morphologically bisexual, they can be functionally unisexual and the plants dioecious (Koch et al., 2002).

In a revision of the American species of *Rauwolfia*, Rao (1956) listed 34 species, 18 of them found in Brazil. Later, Mello Filho (1973) described two new species and reestablished a third one, formerly synonymized by Rao (1956).

The present study is the result of a new revision of the Neotropical species of *Rauwolfia* by Koch (2002), and it reports three taxonomic novelties from Brazil that have been found during this investigation.

**1. *Rauwolfia capixabae*** I. Koch & Kinoshita-Gouvêa, sp. nov. TYPE: Brazil, Espírito Santo: Linhares, Res. Cia. Vale do Rio Doce, 4 Nov. 1999, V. F. Mansano, M. C. S. Rio, D. A. Folli & M. F. Freitas 79 (holotype, UEC; isotypes, CVRD, RB). Figure 1.

Ab omnibus speciebus americanis generis ramis dense lenticellatis, cataphyllis ad nodos ramorum floriferorum majoribus, ramis floriferis foliis juvenilibus instructis et inflorescentiis in nodis terminalibus et floribus albis, maculis rubris ornatis, corollis leviter zygomorphis et tubo ad 8 mm longo differt.

*Trees* (6–)12–15 m tall; branches in whorls of 3 or 4, densely lenticellate, young ones dark brown, older ones light brown; a short internode occurs above each node of normal leaves with lanceolate cataphyll, ca. 4.8 × 2 mm; slender colleters present in branch and

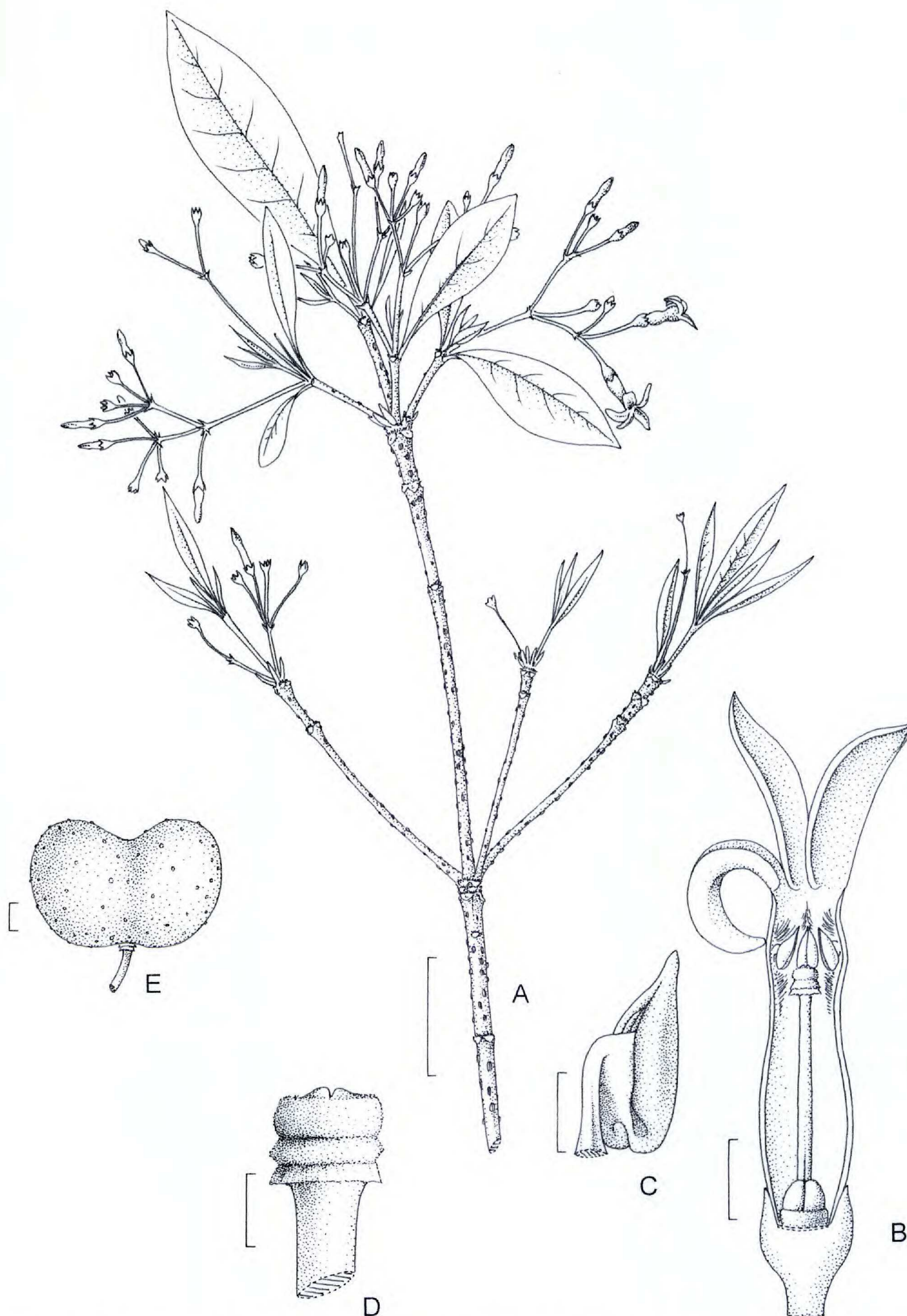


Figure 1. *Rauwolfia capixabae* I. Koch & Kinoshita-Gouvêa. —A. Branch. —B. Flower in longitudinal section. —C. Lateral view of the anther. —D. Style head. —E. Fruit. Drawn from the holotype, *Mansano et al.* 79 (UEC). Scale bars: A = 3 cm; B = 2 mm; C, D = 0.5 mm; E = 5 mm.

inflorescence nodes; floriferous branches provided with juvenile leaves. *Leaves* anisophyllous, 4 or 5 in each node; the larger leaf in the node 5.5–12 × 2–3 cm, petioles 6–9 mm; the smaller leaf in the node

3–6.6 × 0.8–2.4 cm, petioles 5–7 mm; elliptic to obovate-elliptic, membranaceous to papery, leaf blades discolorous, glabrous on both sides, with acute to cuspidate apex, base attenuate and margin entire;

petiole flattened; central vein conspicuous on the abaxial side, secondary veins in 14 to 17 pairs, 5–9 mm distant from each other and curved toward the margin, with occasionally evident arches, tertiary veins immersed and scarcely evident on both sides. *Inflorescences* pleiochasial, whorled, occurring between the petioles, in the end of branches with a shoot in the terminal position, twice the size of its associated leaves, lax with 6 to 10 flowers; peduncle to 2–4 cm; bracteoles 1.5–2 mm, triangular to lanceolate with glandular-toothed margin; pedicels 1–1.4 cm; upper part of flower buds broadened and ovoid. *Flowers* with calyx lobes 2.5–3 × 1.5 mm, fused at the base, triangular, apex acute, margin entire, green; corolla hypocrateriform, slightly zygomorphic, white with red dots on the lobes; tube 5–8 × 1.5–2 mm, broadened in the upper 1/3, constricted below the throat orifice and at the region below the style head, pubescent inside; trichomes straight, becoming progressively longer from the bottom of the tube constriction to the base of the anthers (0.1–0.3 mm), and curved, long (ca. 0.5 mm), and moniliform above the anthers; lobes 3.5–4 × 1.5 mm, reflexed, obliquely ovate with rounded apices; anthers ca. 1 mm, apex located slightly below the throat orifice, apiculate, base touching the apical appendages of the style head; filaments curved, half the length of the anthers, callous at the apex; style head ca. 0.6 mm, main body cylindrical with a broadened portion at the middle, small trichome crown at the upper margin hiding 2 small appendages and a membranaceous skirt at the base; style 3–4.5 mm; ovary ca. 1.3 mm, oblong, slightly sulcate with a round apex, hemisyncarpous; nectariferous disc ca. 0.4 mm high, annular. *Drupe*s partially syncarpic, ca. 2 × 1.5–3 cm, globose (if only one of the carpels is developed) to reniform (if both carpels are developed), green with white dots, epicarp surface lenticellate, endocarp ca. 1 × 1.5 cm, ovoid with surface rugose.

*Distribution and habitat.* The species occurs in the Atlantic Rainforest region throughout the Brazilian states of Espírito Santo and Bahia.

*Phenology.* Collected with flowers in November and with fruits from February to May.

*Relationships.* This arborescent species is recognizable by its large cataphylls or their scars above each node of normal leaves, the densely lenticellate branches with the inflorescences concentrated at the branches tips, and the slightly zygomorphic white flowers with red spots and a corolla tube up to 8 mm long. Specimens of this species have been previously identified as *Rauwolfia mattfeldiana* Markgraf, probably because large cataphylls and white flowers are

common to both species, but *R. mattfeldiana* is an exclusively shrubby species that occurs in open places and presents smaller leaves and flowers, and completely white corollas.

*Etymology.* The species epithet refers to “capi-xaba,” a word that is usually used for people born in the state of Espírito Santo, where the species was found for the first time and has been collected more frequently.

*Paratypes.* BRAZIL. **Bahia:** Uruçuca, Faz. Santa Cruz, W. W. Thomas, A. M. de Carvalho & T. S. dos Santos 7008 (NY). **Espírito Santo:** Linhares, Res. Flor. CVRD, próximo ao escritório, J. Spada 23/77 (MO), A. L. B. Sartori, A. Sciamarelli, I. Koch, R. Goldenberg & V. F. Mansano 201 (UEC), V. F. Mansano & D. A. Folli 57 (UEC); Santa Teresa, Est. Biol. Santa Lúcia, L. Thomaz 731 (MBML, UEC), 733 (MBML, UEC), 737 (MBML, UEC), 738 (MBML, UEC).

**2. *Rauwolfia gracilis*** I. Koch & Kinoshita-Gouvêa, sp. nov. TYPE: Brazil. Rondônia: Faz. São Francisco de Assis, Km 654, estr. Villhena–Pimenta Bueno, 6 Nov. 1979 (fl), M. G. Vieira, R. H. Petersen, B. W. Nelson, J. F. Ramos & C. D. A. Mota 955 (holotype, INPA; isotypes, MO, NY, RB, US). Figure 2.

A *Rauwolfia weddelliana* Müller Argoviensis foliis ovatis, petiolis gracilibus, 1–1.9 cm, lamina foliari supra nitida, nervis secundariis congestis, 20- ad 25-jugatis differt; a *R. praecoci* K. Schumann ex Markgraf habitu suffrutescenti, inflorescentiis per ramum floriferum 6- ad 10-floris et tubis floralibus latioribus (2–2.7 mm diam.) differt.

*Shrubs to small trees*, 0.6–5 m tall; branches 3 to 4 in each verticil, lenticellate, young ones dark brown, older ones rugose and light brown; short internodes and cataphylls at the base of younger branches; triangular cataphylls occasionally evident, ca. 2 mm; toothed colleters in branch and inflorescence nodes. *Leaves* anisophyllous, 3 at each node, large ones 6.6–8.7 × 2–2.3 cm, petiole 1.6–1.9 cm; smaller ones 4.2–6.8 × 1.3–1.8 cm, petiole 1–1.9 cm; leaf blades membranaceous to papery, discolorous, glabrous on both sides, lustrous adaxially, elliptical to ovate-elliptical, apex acute to caudate, base acute to obtuse, margin slightly thickened; petiole flattened; primary vein thin, conspicuous abaxially, secondary veins immersed and occasionally evident adaxially, generally evident abaxially, in 20 to 25 pairs, 2–5 mm distant from each other, oblique with arches next to the margin. *Inflorescences* pleiochasial, whorled, occurring between the petioles, along branches, 1/2 to 2/3 the size of the largest associated leaf, lax, with 6 to 10 flowers; peduncle 0.7–3 cm; triangular bracteoles ca. 1.3 × 0.4–0.8 mm with entire or slightly

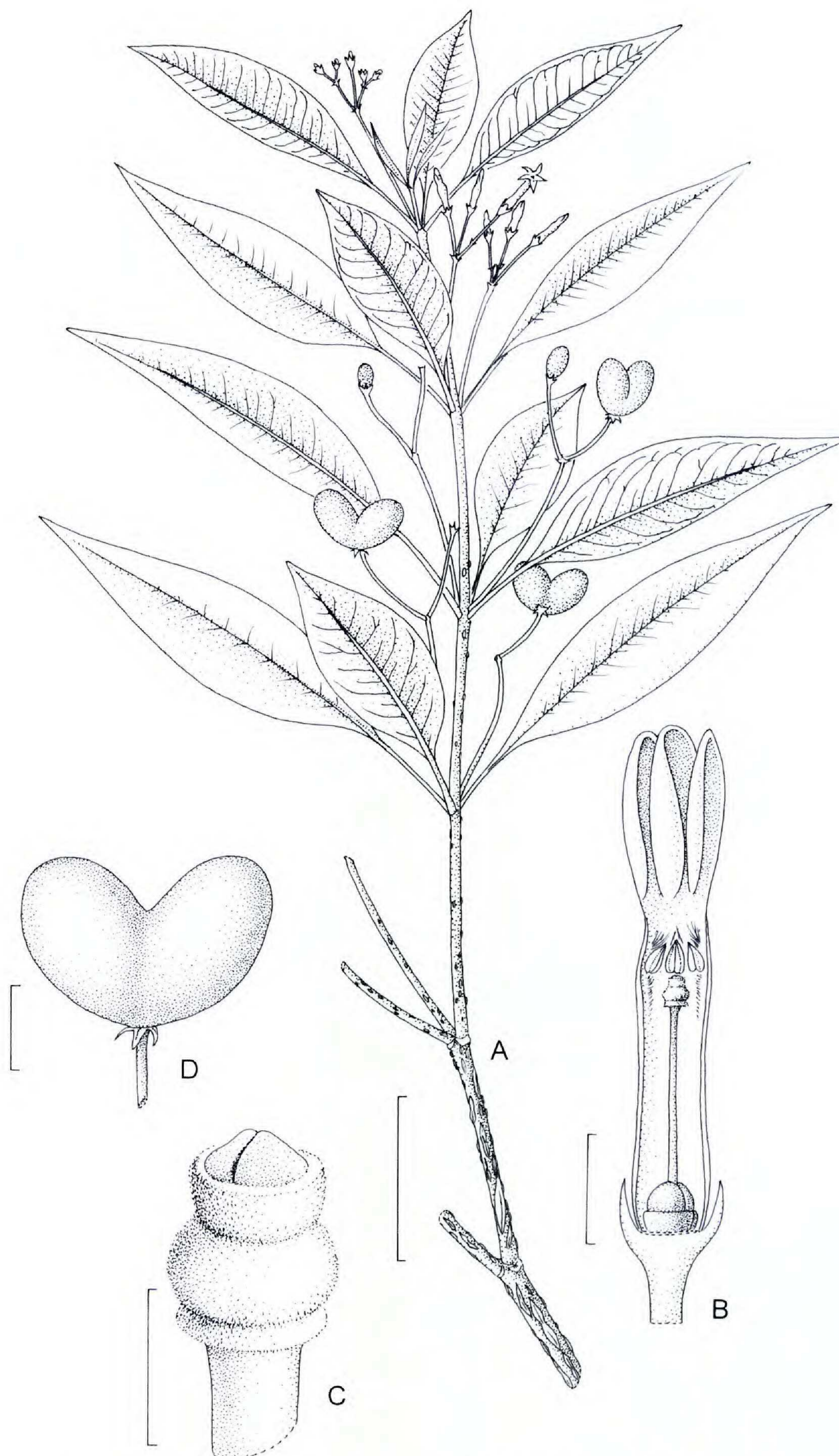


Figure 2. *Rauvolfia gracilis* I. Koch & Kinoshita-Gouvêa. —A. Branch. —B. Flower in longitudinal section. —C. Style head. —D. Fruit. Drawn from the holotype, *Vieira et al.* 955 (INPA). Scale bars: A = 3 cm; B = 2 mm; C = 0.5 mm; D = 5 mm.

toothed margin; pedicel 4–9 mm; upper part of flower buds broadened and ovoid. *Flowers* with calyx with triangular lobes 1.5–2.5 × 1–4 mm, apex acute, fused at the base, margin entire or toothed, green;

corolla hypocrateriform, pink; tube 4.4–6 × 2–2.7 mm, broadened at the upper 1/3, constricted below the throat orifice and at the region below the style head, pubescent inside with trichomes straight,

becoming progressively longer from the bottom of the tube constriction up to the base of the anthers (0.1–0.3 mm), and curved, long (ca. 0.5 mm), and moniliform above the anthers; lobes 2.5–3.5 × 2 mm, patent, ovate-oblique with rounded apex; anthers ca. 1 mm, the apex reaching slightly below the throat orifice, apiculate, the base touching apical appendages of the style head; filaments curved, 1/3 the length of the anthers, callous at the apex; style head ca. 0.7 mm, main body cylindrical with a broadened portion at the middle, small trichome crown at the upper margin that hides 2 small appendages and a membranaceous skirt at the base; style 1–1.3 mm; ovary 1–1.3 mm, subglobose, round apex, hemisyncarpic; nectariferous disc 0.4–0.6 mm high, annular. *Drupes* partially syncarpic, ca. 1.2 × 0.8 cm, ovoid (if one of the carpels is developed) to cordate (if both carpels are developed), green when immature and later red, epicarp surface smooth, endocarp rugose.

*Distribution and habitat.* This species is found throughout field and savanna locations, in sand or clay, in the central-western region of Brazil, from 530 to 900 m.

*Phenology.* Collected with flowers from June to November and with fruits in November.

*Relationships.* *Rauwolfia gracilis* is similar to *R. weddelliana* Müller Argoviensis in habit and flowers and to *R. praecox* K. Schumann ex Markgraf by its leaves. It can be differentiated from *R. weddelliana* by its smooth, slightly ovate leaves with thin petioles, 1–1.9 cm, lustrous adaxial face, secondary veins not very distant from each other, in 20 to 25 pairs, and vein reticulation not evident, whereas *R. weddelliana* has elliptical to obovate-elliptical leaves, subsessile, with the secondary veins more distant from each other, 11 to 16 pairs, and vein reticulation evident. It can be distinguished from *R. praecox* by its shrubby habit, inflorescences with smaller number of flowers (6 to 10 on each branch), and flowers with wider corolla tubes (2–2.7 mm). *Rauwolfia praecox* is a tree with inflorescences with more than 50 flowers on each branch and flowers with narrower corolla tubes (usually 1 mm).

*Etymology.* The species epithet refers to its slender petioles and delicate leaves that give the plant a delicate general aspect.

*Paratypes.* BRAZIL. **Mato Grosso:** Serra do Parecis, estr. Brasília–Acre, B. Maguire, J. Murça-Pires, C. K. Maguire & N. T. Silva 56444 (NY, S, Z). **Rondônia:** estr. Porto Velho–Cuiabá, Km 645, Hallard 13 (BR, K), 14 (BR); Vilhena, BR 364, rodovia Porto Velho–Cuiabá, Km 39, C. A. Cid, J. Lima & J. Guedes 4464 (RB).

**3. *Rauwolfia ligustrina*** Willdenow, in Roemer & Schultes, Syst. Veg. 4: 805. 1819. TYPE: “In America Meridionalis,” *Humboldt & Bonpland 1480* (holotype, B-W 5097 not seen, B-W photo at UEC [F 8424]).

*Rauwolfia ternifolia* Kunth, in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: 232 (ed. quarto) 1819. TYPE: [Colombia.] “Crescit in ripa fluminis Magdalena, prope Mompox,” *Humboldt & Bonpland 1480* (lectotype, designated here, P 844, P photo at UEC; isotypes, B†, B photos at F, GH, and NY [F 4475], P fragment at F).

*Rauwolfia blanchetii* A. DC., in DC., Prodr. 8: 340. 1844. Syn. nov. TYPE: Brazil. Bahia: Jacobina, Vila da Barra, Serra de Açurna, 1839, *Blanchet 2718* (lectotype, designated here, G; isotypes, BM, BR, F, F photos at F, G, K, and NY [F 51191], K photo at UEC).

*Rauwolfia mollis* S. Moore, Trans. Linn. Soc. London, Bot. 4: 393. 1895. Syn. nov. TYPE: Brazil. Mato Grosso: Nov. 1893, S. Moore 950 (holotype, BM, BM photo at NY [NY 675]; isotypes, B not seen, B photos at F, GH, and NY [F 4465], K not seen, K photo at UEC).

*Rauwolfia divergens* Markgraf, Feddes Repert. Spec. Nov. Regni Veg. 20: 119. 1924. Syn. nov. TYPE: Paraguay. “Villa Sana entre Rio Apa e Rio Aquidaban,” 21 Jan. 1909, *Fiebrig 4664* (holotype, M; isotypes, B†, B photos at F, GH, and NY [F 4460], G [3], K, K photo at UEC, L, M not seen, P not seen, S not seen).

Roemer and Schultes’ *Rauwolfia ligustrina* and Kunth’s *R. ternifolia* were described in the same year (1819) and were based on duplicates of the same material from the Humboldt and Bonpland collections that had been stored in the herbaria B-W and P-Bonpland. An article written by MacVaugh (1955) gives us some idea about the history of the material collected by Humboldt and Bonpland and the duplicate set first sent to Willdenow for analysis. MacVaugh (1955) reported all the problems and the misunderstandings that occurred after Willdenow’s death because of the publication of new species by several authors without Humboldt’s permission (Humboldt had given this task to Kunth after Willdenow’s death). In the same publication, MacVaugh emphasizes the concern for priority, especially for those names published concomitantly by Roemer and Schultes and by Kunth, and the efforts of Kunth to record and solve those conflicts. MacVaugh lists Roemer and Schultes’ species names that have priority over Kunth’s species names and one of these is *R. ligustrina*. This list was based on a study by Kunth (1830 apud MacVaugh, 1955), who considered the dates of publication of both studies.

The information about type material of species differed in the original description of them. For *Rauwolfia ligustrina* a precise locality is not given, but Humboldt and Bonpland (s.n.) are cited as collectors. For *R. ternifolia* a precise locality is given but no

collectors cited, although they are implied. Fortunately, we were able to analyze photographs and copies of microfiches of the type material of both species, from the B-W and P-Bonpland herbaria. On the specimen of *R. ligustrina* from B-W we found that labels written by Willdenow carry original description data of *R. ligustrina*, as well as general information about the location (“In America Meridionalis”) as cited in Roemer and Schultes’ original description. This material also shows the inscription “Bonpland 1480,” which was not reported, however, in the *R. ligustrina* protologue. Possibly, this is a later annotation. Furthermore, this specimen shows annotations of Markgraf and a label of Leeuwenberg, suggesting that it is the same type as the one of *R. ternifolia* (“= *R. ternifolia*”; “isotype of *R. ternifolia*”); however, Leeuwenberg’s annotation erroneously depicts Ruiz and Pavón as the author of the species name. Another sheet, with the same collection number of Humboldt and Bonpland (1480), was also located among the photographs of the Berlin herbarium type material in the Field Museum negatives collection (F 4475). The photographs show the inscription “Rockefeller Foundation,” this being the foundation that sponsored the project of photographing types in European herbaria between 1929 and 1931 (Grime & Plowman, 1986).

This material carries the same locality information as on the holotype of *Rauwolfia ternifolia* (“ripa fluminis Magdalena, prope Mompox”) and is identified as *R. ternifolia*. Furthermore, it has an annotation with the information about Kunth’s publication of *R. ternifolia* and a faint note “hb. Kunth.” This was probably written by Kunth and suggests that the specimen was donated or analyzed by Kunth after the publication of *R. ternifolia*.

Probably neither Willdenow nor Roemer and Schultes examined the second specimen that was photographed at the Berlin herbarium, as the more detailed locality information is not mentioned in the original description of *Rauwolfia ligustrina*. This suggests that this specimen was not part of Willdenow’s herbarium. It was probably destroyed during the fire that took place at the Berlin herbarium during World War II. We could not localize the holotype of *R. ternifolia* in the P-Bonpland collection at Paris. Two specimens of *R. ternifolia*, however, with the same collection number 1480 as on the specimen in B-W, were found in the general collection of the Paris herbarium. They were filed under *R. ligustrina* and had annotations by Rao identifying them as isotypes of *R. ternifolia*. We are not sure if Kunth used both specimens or only one (and if so, which one) for the description of *R. ternifolia*. The identification as *R. ternifolia*, however, has Kunth’s handwriting. As we could not identify the holotype with certainty, we

decided to designate one of these Paris specimens as the lectotype (P 844) for *R. ternifolia*.

Although neither Roemer and Schultes (1819) nor Kunth (1819) had made any mention of a collection number of Humboldt and Bonpland in the protologues of *Rauwolfia ligustrina* and *R. ternifolia*, respectively, the numbers used by Humboldt and Bonpland have proved to be consistent (Rodríguez & Greuter, 2001; Lack, 2004) even when the use of collection numbers was not then common among botanists (Lack, 2004).

Willdenow is considered the author of *Rauwolfia ligustrina* because there is a citation at the end of the protologue of the species, “Herb. Willd. Ms.,” which indicates the intention of Roemer and Schultes to ascribe the name and the validating diagnosis to Willdenow (McNeill et al., 2007).

*Rauwolfia ligustrina* is a small shrub that can be easily recognized by its 3-verticillate oval-elliptical leaves with an acuminate apex, 1–7 × 1–3 cm, and by its tiny white flowers, with lanceolate-acuminate calyx lobes, as well as by its completely syncarpic fruit.

Observations on *Rauwolfia ligustrina* made by Rao (1956) pointed out that various synonyms of this species name resulted mainly from an erroneous interpretation of the variations found in the leaf, and that characters such as leaf size, flower number, and hair indument are rather variable, not permitting the distinction of different species. Rao (1956), however, earlier kept *R. blanchetii* and *R. mollis* as distinct species.

*Rauwolfia mollis* was separated from *R. ligustrina* mainly by its whitish hairs on the branches, leaves, and peduncles; its more abundantly branched inflorescences; and flowers with calyx lobes that are ovate, in contrast to the linear-lanceolate calyx lobes typical of *R. ligustrina*. Analyses of specimens of both species at first revealed a different pattern in material of *R. ligustrina* collected in Central America and the Antilles. Plants of this group show smaller leaves and appressed hairs only on veins and peduncles, while specimens collected throughout the central-western region of Brazil and in the eastern region of Paraguay have larger leaves and a dense whitish indument on leaves and peduncles, rarely only along the central vein and peduncles. Some exceptions, however, can also be noted among these specimens, which make the establishment of clear morphotypes more difficult. In addition, further analyses of specimens collected throughout the northern and northeastern regions of South America and Bolivia revealed a continuous variation of all characters used to distinguish *R. ligustrina* from *R. mollis*. The material from Bolivia often showed glabrous leaves or hairs only on the main vein, which was unexpected because

of the geographical proximity to the Paraguayan and central-western Brazilian populations. Our conclusion therefore is that there are no consistent morphological characters that separate both species, despite the disjunct distribution pattern; thus, *R. mollis* is synonymized under *R. ligustrina*.

Rao (1956) synonymized *Rauvolfia divergens* under *R. mollis*. We agree with Rao and consequently *R. divergens* is now listed under *R. ligustrina*, along with *R. mollis*.

Rao (1956) maintained *Rauvolfia blanchetii* as a separate species because it has a yellowish, densely tomentose indumentum on leaves and peduncles, ovate leaves with a mucronate apex, and flowers with ovate corolla lobes with an acute apex. The type material is from a semi-arid region in the Brazilian state of Bahia, and the dense indument, despite being evident and not common on individuals of *R. ligustrina* collected in less arid areas nearby, is not sufficient to accept *R. blanchetii* as a separate species. The remaining morphological features otherwise match the other character variations found among specimens of *R. ligustrina*, especially after the inclusion of *R. mollis*. Moreover, the geographic distribution of both species is continuous. Thus, *R. blanchetii* is included in *R. ligustrina*. The specimen *Blanchet 2718* (G) is here chosen from the syntypes cited in the protologue of *R. blanchetii* as the lectotype of the species, because this specimen is the most complete and well represented in herbarium collections.

**4. *Rauvolfia moricandii*** A. DC., in DC., Prodr. 8: 340. 1844. TYPE: Brazil. Bahia: *Blanchet 1007* (holotype, G-DC, G-DC photo at F and NY; isotypes, BM, G).

*Rauvolfia pernambucensis* Emygdio, Revista Brasil. Biol. 33(4): 513. 1973. Syn. nov. TYPE: Brazil. Pernambuco: Rio Formoso, Horto Florestal de Salinho, J. A. L. Falcão, W. A. Engler & E. Pereira 1208 (holotype, RB 89120).

Rao (1956) placed *Rauvolfia moricandii* in section *Rauvolfia* L., which is characterized, among other features, by leaves with intrapetiolar glands in the axil and on the petioles, corolla tube 2–3 mm long, and fruits fully syncarpous. At that time the species was rare among herbarium material and the author only had access to the type specimen. Rao (1956) commented that the species could be misplaced in that section because of the paucity of petiolar glands, the rather long corolla tube (4–5 mm), and a hemisyncarpous ovary and suggested that the morphological study of more specimens might shift the species to the section *Macrovolfia* (Pichon) A. S. Rao.

Later, Mello Filho (1973) described a new species, *Rauvolfia pernambucensis*, and compared it only with species from section *Macrovolfia*. He did not discuss similarities between *R. pernambucensis* and *R. moricandii*, possibly in consideration of the supposed presence of colleters on the petioles of *R. moricandii*. We found that the species are very similar, and we were unable to find colleters on the petioles of the type specimen of *R. moricandii*. The comparison of this species with *R. pernambucensis* did not point to any character that could support the maintenance of the latter name. Thus, *R. pernambucensis* is synonymized under *R. moricandii*.

**5. *Rauvolfia pentaphylla*** Ducke, Arch. Jard. Bot. Rio de Janeiro 3: 244. 1922. TYPE: Brazil. Pará: Óbidos, A. Ducke s.n. (lectotype, designated by Rao, 1956: 316, RB 13298; isotypes, B†, B photos at F, GH, NY, and RB [F 4471], BM 49462, G, MG 11038 not seen, MG photo at F, US 1040516).

*Rauvolfia duckei* Markgraf, Feddes Repert. Spec. Nov. Regni Veg. 20: 117 [in key], 121. 1924. TYPE: Brazil. Pará: Gurupá, s.d., A. Ducke s.n. (holotype, B†, B photo at F and GH [F 4661]; isotypes, BM 49463, G, MG 16544, RB 13299, US 1040928).

Rao (1956) placed *Rauvolfia duckei* as a synonym of *R. pentaphylla* because he believed that the diagnostic characters could be found within the morphological variation of *R. pentaphylla*. Mello Filho (1973) independently recognized *R. duckei* using quantitative floral characters. *Rauvolfia duckei* is here once more recognized as a synonym of *R. pentaphylla*. After examination of the type material of both species as well as of additional material, we agree with Rao (1956) that there is no morphological justification to consider *R. duckei* as a distinct species.

Markgraf (1924) cited *Ducke 16544* in the original description of *Rauvolfia duckei* but did not designate the herbarium of the holotype. A photograph of the material from B is kept in F and GH, and this was probably the holotype since Markgraf worked at the Berlin herbarium at that time. The specimen could not be located, however, and was probably lost during World War II. Examining the specimens among the isotypes, we noticed that the number associated with Ducke's name was not a collector number but a herbarium (MG) number. This misinterpretation by Markgraf in confusing this herbarium number with a collection number of Ducke has been previously made.

**6. *Rauvolfia pruinifolia*** L. Koch & Kinoshita-Gouvêa, sp. nov. TYPE: Brazil. Minas Gerais: Governador Valadares, bacia do Rio Doce, 1

June 1961, G. M. Magalhães 18840 (holotype, PEL; isotypes, B, F, MG). Figure 3.

A *Rauvolfia grandiflora* Martius ex A. DC. habitu altitudine altiore, nodo verticillato in ramis floriferis unico, foliis fortiter anisophyllis, pruinosis, ceris crystallinis in lamellis epicuticularibus vestitis, inflorescentiis brevioribus, 6- ad 12-floris et lobis corollae minoribus (2.5 mm longis) differt.

*Tree*, 10–15 m tall; branches 3 or 4 on each whorl, slightly lenticellate, younger branches dark brown, older branches paler brown; short internodes with cataphylls above each alternate node of leaves; triangular cataphylls inconspicuous, ca. 1.5 mm; slender colleters on branch and inflorescence nodes. *Leaves* strongly anisophyllous, 4 or 5 on each node, the smaller ones less than 1/2 the size of the larger ones; larger leaves 7–9.6(–12) × 2.5–3(–5) cm, petiole sessile or to 1.6 mm; smaller leaves 2.5–4.8 × 1–2 cm, sessile; leaf blades papery, discolorous, glabrous on both faces but pruinose in adaxial surface, elliptical to obovate-elliptical, apex acute to cuspidate, base attenuate, margin slightly revolute; primary vein narrow, conspicuous on both blade faces, secondary veins immersed, less evident adaxially, 3–7 mm distant each from other, curved toward the margins, 9 to 14 pairs. *Inflorescences* pleiochasial, whorled, between the petioles of whorled leaves, at the end of branches, 1/3 to 1/2 the size of largest associated leaf, lax, 6 to 12 flowers; peduncle 2–3 cm; bracteoles triangular, ca. 1 mm, with toothed margins; pedicel 4–6 mm; upper part of flower buds broadened, oval to oblong. *Flowers* with calyx with deltoid lobes, 1.5–2 × 1 mm, apex acute, margins entire to toothed, subglandular, green; corolla hypocrotiform, white with red spots on the lobes; tube ca. 15 × 2 mm, broadened in the upper 1/3, constricted below the throat at the region below the style head, pubescent inside with trichomes straight, becoming progressively longer from the beginning of the tube (0.1–0.3 mm), narrowing to the base of the anthers, long and moniliform above the anthers (0.5 mm); lobes ca. 2.5 × 1.5 mm, patent, oval with rounded apex; anthers ca. 1 mm with apiculate apex shortly below the orifice of the corolla tube, base touching the apical appendages of style head; filaments curved, 1/3 the size of the anthers and callous at the apex; style head ca. 0.6 mm, main body cylindrical, broad at the middle, with a small trichome tuft at the upper margin that hides the appendages and with a membranaceous skirt at the base; style ca. 5.8 mm; ovary subglobose, ca. 1.3 mm, syncarpous only at the base, with a rounded apex; nectariferous disc ca. 0.4 mm high, annular. *Fruit* not seen.

*Distribution and habitat.* Specimens of this species were collected only in the Governador Valadares

region (Brazilian state of Minas Gerais), in forests located at the Rio Doce Basin and by a single collector. This suggests that the collections were made from perhaps only a single individual and the lack of other collections may place this species at a high extinction risk.

*Phenology.* Flowering from June to October.

*Relationships.* *Rauvolfia pruinifolia* differs from *R. grandiflora* with a tree height of 10–15 m (there is one report of a 2-m-high shrub, probably from a young individual), and there is only one leaf whorl on floriferous branches. It shows strongly anisophyllous leaves, and the inflorescences are up to half the size of the largest associated leaf, with flowers that have corolla lobes to 2.5 mm long. *Rauvolfia grandiflora* bears more than one leaf whorl on the floriferous branch, only slightly anisophyllous leaves, and inflorescences that are slightly shorter to longer than the largest associated leaf, with flowers that have corolla lobes 4–8 mm long. Moreover, plants of *R. grandiflora* commonly form shrubs or small trees.

*Etymology.* Individuals of *Rauvolfia pruinifolia* present epicuticular wax crystals that occur as plaques on the leaf surface; SEM studies (Koch et al., 1998) have revealed that such wax crystals are not found in any other Neotropical species of *Rauvolfia*. These waxes give the leaf a whitish powdery aspect, which is why the name *R. pruinifolia* has been chosen for this species.

*Paratypes.* Brazil. **Minas Gerais:** Governador Valadares, G. M. Magalhães 4431 (BM), 19185 (NY).

**7. *Rauvolfia weddelliana*** Müller Argoviensis, in Martius, Fl. Bras. 6(1): 32. 1860. TYPE: Brazil. “Entre Goiás e Cuiabá,” Weddell 2966 (lectotype, designated by Rao, 1956: 331, P not seen; isotype, F).

*Rauvolfia sessilifolia* S. Moore, J. Bot. 42: 103. 1904. Syn. nov. TYPE: Brazil. Mato Grosso: Sant’Anna da Chapada, Robert 494 (holotype, BM; isotype, BM photo at NY [676]).

In Rao’s revision (1956), *Rauvolfia sessilifolia* and *R. weddelliana* were kept separate although the author had seen only the photograph of the type material of *R. sessilifolia*. Later, Rao (in sched., Robert 494) suggests his intention to synonymize *R. sessilifolia* under *R. weddelliana*, after examining the type specimen of *R. sessilifolia*, which he identified as *R. weddelliana*. By analyzing the type material and other specimens of both species, their continuous morphological variation could be verified herein. The characters that were used to distinguish the species,





Figure 3. *Rauwolfia pruinosifolia* I. Koch & Kinoshita-Gouvêa. —A. Branch. —B. Large basal leaf in detail. —C. Flower in longitudinal section. —D. Style head. Drawn from the paratype, *Magalhães 4431* (BM). Scale bars: A, B = 3 cm; C = 2 mm; D = 0.5 mm.

such as the leaf shape and the calyx size, are variable even within a single population. Thus, *R. sessilifolia* is synonymized herein under *R. weddelliana*.

Specimens collected in the Serra do Cachimbo region, in the northern Brazilian state of Pará, present somewhat deviating morphological features, such as generally wide, elliptical leaves with less evident reticulation and terminal inflorescences with few flowers (8 to 12 flowers per inflorescence branch), whereas most individuals of *Rauwolfia weddelliana* from other regions present slightly obovate leaves with evident reticulation and ca. 30 flowers on each inflorescence branch. We did consider the possibility of erecting a new subspecies for the Serra do Cachimbo plants, which would also be supported by their disjunct distribution. After analyzing additional material, however, the existence of similar individuals at the Chapada dos Guimarães (state of Mato Grosso) region became evident (there are many collections of *R. weddelliana* from this region), as well as the existence of individuals with more typical features of *R. weddelliana* in the Serra do Cachimbo region. Therefore, we refrain from describing a new subspecies. We believe, however, that genetic studies of the populations of this species would greatly help future taxonomic decisions.

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